Work Order ID 88787

August-03-12 7:47:00 AM

88787

Item ID: D412-664-203TRN **Accept** *N900040100* **Setup Start** *NS1*

Revision ID: **Stop** *NS2*

Item Name: Crosstube Turning Detail

Start Date: 03/08/2012 **Start Qty:** 1.00 *1*

Required Date: 17/08/2012 **Req'd Qty:** 1.00 *1*

Reference:

Cust Item ID:

Customer:

Run Start *NR1*

Stop *NR2*

Approvals: **Process Plan:** ML5 **Date:** 12/08/03 **Tooling:** **Date:**

QC: **Date:** **SPC (Y/N):** **Date:**

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
Draw Nbr	**Revision Nbr**								
D412-664-243	Rev E(DEO)								
100		0.00							
100	MORI SEIKI CNC LATHE LARGE					1	Ø		
Mori Seiki	**Memo**	0.00							
Mori Seiki CNC Lathe Large	1-Fill tube with sand & install plugs DT8534 on both ends as per Folio FA166 2-Turn first side as per Folio FA166 3- File transition lines smooth. FOLIO REV: AA DWG REV: F								mark 12/08/07
110	QC1- Inspect dimensions to dimension sheet	0.00							
110						1	Ø		
QC	**Memo**	0.00							
Quality Control									mark 12/08/07

NCR: Yes / (No)

WORK ORDER NON-CONFORMANCE / UPDATE

DQA: [signature] Date: 12/08/22

QA Closed: TC Date: 8/22/17

Work Order: 88787

Part No. D 412-664-203TRN

NCR No. 12-1716

DISPOSITION

Rework	
Scrap	
Use-as-is	X
Work Order Update	

AGAINST DEPARTMENT/PROCESS

Skid-tube		Crosstube	X	Water Jet	
Machining		Small Fab		Prod. Eng. Coor.	
Thermoforming		Finishing		Rec/Store/Packaging	
Large Fab		Composite		Supplier	

Engineering	
Quality	
Other	

Root Cause		Date	Step	Qty	Description of work order update or Non-conformance	Initial Chief Eng	Action Description	Sign & Date	Verification	QC Inspector
Doc/Data		12/8/15	100	1	Cuffs are Machined out of tolerance - 2.991" - 2.984" 2.991" - 2.986"	DAS 12 8-89 12/8/15	Acceptable	DAS 12 8-89 12/8/15	DAS 16 8-89 12/08/16	DAS 16 9-89 12/08/16
Equip/Tooling	X									
Operator	X									
Material	X									
Setup										
Other										
Process	X									
Supplier										
Training										
Unapproved										

FAULT CATEGORY

Landing Gear

	Bending
	Centre Not Concentric to O/S
	Cracks
	Crushed/Crimped.
	Cuffs
	Heat Treat
	Inspection Strip in Tube
	Ripples in Bend
	Torque Waves in Extrusion
X	Turning Sequence
	Wave/Twist in Tube

General

	Bend
	BOM/Route
	Broken/Damaged
	Burrs
	Contamination
	Countersink
	Cut Too Short
	Drill Holes
	Drawing
	Finish
	Folio

	Grain
	Hardware
	Inspection Incomplete
	Instructions Incomplete/Unclear
	Maintenance
	Mislabeled
	Misread
	Offset
	Out of Calibration
	Out of Sequence
	Outside Dimensions

	Ovalized
	Over/Under tolerance
	Part Incorrect
	Part Lost/Missing
	Part Moved
	Positioned Wrong
	Power Loss/Surge

	Pressure/Forced
	Temperature/Cure
	Weld
	Wrong Stock Pulled
	Other

H:/FORMS/Quality Assurance\approved QA/NCRWO Rev G

Work Order ID 88787

August-03-12 7:47:00 AM

88787

Item ID: D412-664-203TRN **Accept** *N900040100* **Setup Start** *NS1*

Revision ID: **Stop** *NS2*

Item Name: Crosstube Turning Detail

Start Date: 03/08/2012 **Start Qty:** 1.00 *1* **Cust Item ID:**

Required Date: 17/08/2012 **Req'd Qty:** 1.00 *1* **Customer:**

Reference:

Run Start *NR1*

Stop *NR2*

Approvals: **Process Plan:** _____ **Date:** _____ **Tooling:** _____ **Date:** _____

QC: _____ **Date:** _____ **SPC (Y/N):** _____ **Date:** _____

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
120	MORI SEIKI CNC LATHE LARGE	0.00				1	Ø		
120									
Mori Seiki	**Memo**	0.00							
Mori Seiki CNC Lathe Large	1-Turn second side as per Folio FA166 2- File transition lines smooth. 3- Remove sand and plugs 4-Scribe part # and batch # using vibrating stilus FOLIO REV: AA DWG REV: E								amanL 12/08/08
130	QC1- Inspect dimensions to dimension sheet	0.00				1	Ø		
130									
QC	**Memo**	0.00							
Quality Control	+ PERFORM ULTRA SONIC MEASUREMENT								amanL 12/08/08
140	QC8- Inspect parts - second check	0.00							
140									
QC	**Memo**	0.00							
Quality Control	+ CHECK ULTRA SONIC MEASUREMENT AND ORIENTATION FOR BENDING					JW	12-8-16		

DAS 16 8-8-16 12/08/16

DQA: _____ Date: _____

NCR: Yes / No

WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: Date:

Work Order: _____

Part No. _____

NCR No. _____

DISPOSITION

Rework ☐
Scrap ☐
Use-as-is ☐
Work Order Update ☐

AGAINST DEPARTMENT/PROCESS

Skid-tube ☐ Crosstube ☐ Water Jet ☐ Engineering ☐
Machining ☐ Small Fab ☐ Prod. Eng. Coor. ☐ Quality ☐
Thermoforming ☐ Finishing ☐ Rec/Store/Packaging ☐ Other ☐
Large Fab ☐ Composite ☐ Supplier ☐

Root Cause		Date	Step	Qty	Description of work order update or Non-conformance	Initial Chief Eng	Action Description	Sign & Date	Verification	QC Inspector
Doc/Data	☐									
Equip/Tooling	☐									
Operator	☐									
Material	☐									
Setup	☐									
Other	☐									
Process	☐									
Supplier	☐									
Training	☐									
Unapproved	☐									

FAULT CATEGORY

Landing Gear

☐ Bending
☐ Centre Not Concentric to O/S
☐ Cracks
☐ Crushed/Crimped
☐ Cuffs
☐ Heat Treat
☐ Inspection Strip in Tube
☐ Ripples in Bend
☐ Torque Waves in Extrusion
☐ Turning Sequence
☐ Wave/Twist in Tube

General

☐ Bend
☐ BOM/Route
☐ Broken/Damaged
☐ Burrs
☐ Contamination
☐ Countersink
☐ Cut Too Short
☐ Drill Holes
☐ Drawing
☐ Finish
☐ Folio
☐ Grain
☐ Hardware
☐ Inspection Incomplete
☐ Instructions Incomplete/Unclear
☐ Maintenance
☐ Mislabeled
☐ Misread
☐ Offset
☐ Out of Calibration
☐ Out of Sequence
☐ Outside Dimensions
☐ Ovalized
☐ Over/Under tolerance
☐ Part Incorrect
☐ Part Lost/Missing
☐ Part Moved
☐ Positioned Wrong
☐ Power Loss/Surge
☐ Pressure/Forced
☐ Temperature/Cure
☐ Weld
☐ Wrong Stock Pulled
☐ Other

_____
_____
_____

Work Order ID 88787

August-03-12 7:47:00 AM

88787

Item ID: D412-664-203TRN **Accept** *N900040100* **Setup Start** *NS1*

Revision ID: **Stop** *NS2*

Item Name: Crosstube Turning Detail

Start Date: 03/08/2012 **Start Qty:** 1.00 *1*

Required Date: 17/08/2012 **Req'd Qty:** 1.00 *1*

Reference:

Cust Item ID:

Customer:

Run Start *NR1*

Stop *NR2*

Approvals: **Process Plan:** _____ **Date:** _____ **Tooling:** _____ **Date:** _____

QC: _____ **Date:** _____ **SPC (Y/N):** _____ **Date:** _____

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
145		0.00							
145									
Crosstubes	**Memo**	0.00							
Crosstubes	GRIND ONLY TRANSITION LINES SMOOTH LONGITUDE WAY.								
					JW		12-8-16		
150		0.00							
150									
HandFXtube	**Memo**	0.00							
Hand Finishing Crosstubes	1- PRESSURE WASH X-TUBE INSIDE AND OUT								
	2- ACID ETCH X-TUBE INSIDE AND OUT. USE RED SCOTCH BRITE								
					JW / RM		12-8-19		
160	QC5- Inspect part completeness to step on W/O	0.00							
160									
QC	**Memo**	0.00							
Quality Control									
					DAS 16 9:33	12/08/12			

DQA: _____ Date: _____

NCR: Yes / No

WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: Date:

Work Order: _____

Part No. _____

NCR No. _____

DISPOSITION

- Rework ☐
- Scrap ☐
- Use-as-is ☐
- Work Order Update ☐

AGAINST DEPARTMENT/PROCESS

Skid-tube ☐	Crosstube ☐	Water Jet ☐	Engineering ☐
Machining ☐	Small Fab ☐	Prod. Eng. Coor. ☐	Quality ☐
Thermoforming ☐	Finishing ☐	Rec/Store/Packaging ☐	Other ☐
Large Fab ☐	Composite ☐	Supplier ☐	

Root Cause		Date	Step	Qty	Description of work order update or Non-conformance	Initial Chief Eng	Action Description	Sign & Date	Verification	QC Inspector
Doc/Data	☐									
Equip/Tooling	☐									
Operator	☐									
Material	☐									
Setup	☐									
Other	☐									
Process	☐									
Supplier	☐									
Training	☐									
Unapproved	☐									

FAULT CATEGORY

Landing Gear

- ☐ Bending
- ☐ Centre Not Concentric to O/S
- ☐ Cracks
- ☐ Crushed/Crimped
- ☐ Cuffs
- ☐ Heat Treat
- ☐ Inspection Strip in Tube
- ☐ Ripples in Bend
- ☐ Torque Waves in Extrusion
- ☐ Turning Sequence
- ☐ Wave/Twist in Tube

General

- ☐ Bend
- ☐ BOM/Route
- ☐ Broken/Damaged
- ☐ Burrs
- ☐ Contamination
- ☐ Countersink
- ☐ Cut Too Short
- ☐ Drill Holes
- ☐ Drawing
- ☐ Finish
- ☐ Folio
- ☐ Grain
- ☐ Hardware
- ☐ Inspection Incomplete
- ☐ Instructions Incomplete/Unclear
- ☐ Maintenance
- ☐ Mislabeled
- ☐ Misread
- ☐ Offset
- ☐ Out of Calibration
- ☐ Out of Sequence
- ☐ Outside Dimensions
- ☐ Ovalized
- ☐ Over/Under tolerance
- ☐ Part Incorrect
- ☐ Part Lost/Missing
- ☐ Part Moved
- ☐ Positioned Wrong
- ☐ Power Loss/Surge
- ☐ Pressure/Forced
- ☐ Temperature/Cure
- ☐ Weld
- ☐ Wrong Stock Pulled
- ☐ Other _____

Item ID: D412-664-203TRN
Revision ID:
Item Name: Crosstube Turning Detail
Start Date: 03/08/2012 **Start Qty:** 1.00 *1*
Required Date: 17/08/2012 **Req'd Qty:** 1.00 *1*
Reference:

Accept *N900040100*
Setup Start *NS1*
Stop *NS2*
Cust Item ID:
Customer:

Run Start *NR1*
Stop *NR2*

Approvals: **Process Plan:** _____ **Date:** _____ **Tooling:** _____ **Date:** _____
QC: _____ **Date:** _____ **SPC (Y/N):** _____ **Date:** _____

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
170		0.00							
170	Packaging								
Packaging	**Memo**	0.00	MO	12/8/20					
Packaging	Identify and stock in kanban rack Location: LL								
180	QC21- Final Inspection - Work Order Release	0.00							
180									
QC	**Memo**	0.00					MLJ 12/08/20		
Quality Control									

MLJ 12/08/20

DQA: _____ Date: _____

NCR: Yes / No

WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: Date:

Work Order: _____

Part No. _____

NCR No. _____

DISPOSITION

- Rework ☐
- Scrap ☐
- Use-as-is ☐
- Work Order Update ☐

AGAINST DEPARTMENT/PROCESS

- Skid-tube ☐
- Machining ☐
- Thermoforming ☐
- Large Fab ☐
- Crosstube ☐
- Small Fab ☐
- Finishing ☐
- Composite ☐
- Water Jet ☐
- Prod. Eng. Coor. ☐
- Rec/Store/Packaging ☐
- Supplier ☐
- Engineering ☐
- Quality ☐
- Other ☐

Root Cause		Date	Step	Qty	Description of work order update or Non-conformance	Initial Chief Eng	Action Description	Sign & Date	Verification	QC Inspector
Doc/Data	☐									
Equip/Tooling	☐									
Operator	☐									
Material	☐									
Setup	☐									
Other	☐									
Process	☐									
Supplier	☐									
Training	☐									
Unapproved	☐									

FAULT CATEGORY

Landing Gear

- ☐ Bending
- ☐ Centre Not Concentric to O/S
- ☐ Cracks
- ☐ Crushed/Crimped
- ☐ Cuffs
- ☐ Heat Treat
- ☐ Inspection Strip in Tube
- ☐ Ripples in Bend
- ☐ Torque Waves in Extrusion
- ☐ Turning Sequence
- ☐ Wave/Twist in Tube

General

- ☐ Bend
- ☐ BOM/Route
- ☐ Broken/Damaged
- ☐ Burrs
- ☐ Contamination
- ☐ Countersink
- ☐ Cut Too Short
- ☐ Drill Holes
- ☐ Drawing
- ☐ Finish
- ☐ Folio
- ☐ Grain
- ☐ Hardware
- ☐ Inspection Incomplete
- ☐ Instructions Incomplete/Unclear
- ☐ Maintenance
- ☐ Mislabeled
- ☐ Misread
- ☐ Offset
- ☐ Out of Calibration
- ☐ Out of Sequence
- ☐ Outside Dimensions
- ☐ Ovalized
- ☐ Over/Under tolerance
- ☐ Part Incorrect
- ☐ Part Lost/Missing
- ☐ Part Moved
- ☐ Positioned Wrong
- ☐ Power Loss/Surge
- ☐ Pressure/Forced
- ☐ Temperature/Cure
- ☐ Weld
- ☐ Wrong Stock Pulled
- ☐ Other _____

Picklist Print

August-03-12 7:47:04 AM

Work Order ID: 88787

88787

Parent Item: D412-664-203TRN

D412-664-203TRN

Parent Item Name: Crosstube Turning Detail

Start Date: 03/08/2012 **Required Date:** 17/08/2012

Start Qty: 1.00 **Required Qty:** 1.00

Comments: IPP Rev:A 08-03-06 new issue DD verified by:eec
IPP Rev B 08.04.02 Removed polish EC verified by: DD

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
D6009-129		Manufactured	No			120	Each	12.0000	1	1			

D6009-129

Crosstube Material

**

Location	Loc Qty	Loc Code
LG	12	
69801	12	

1 mm.L 12/08/07

DQA: _____ Date: _____

NCR: Yes / No

WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: Date:

Work Order: _____

Part No. _____

NCR No. _____

DISPOSITION

- Rework ☐
- Scrap ☐
- Use-as-is ☐
- Work Order Update ☐

AGAINST DEPARTMENT/PROCESS

Skid-tube ☐	Crosstube ☐	Water Jet ☐	Engineering ☐
Machining ☐	Small Fab ☐	Prod. Eng. Coor. ☐	Quality ☐
Thermoforming ☐	Finishing ☐	Rec/Store/Packaging ☐	Other ☐
Large Fab ☐	Composite ☐	Supplier ☐	

Root Cause		Date	Step	Qty	Description of work order update or Non-conformance	Initial Chief Eng	Action Description	Sign & Date	Verification	QC Inspector
Doc/Data	☐									
Equip/Tooling	☐									
Operator	☐									
Material	☐									
Setup	☐									
Other	☐									
Process	☐									
Supplier	☐									
Training	☐									
Unapproved	☐									

FAULT CATEGORY

Landing Gear

- ☐ Bending
- ☐ Centre Not Concentric to O/S
- ☐ Cracks
- ☐ Crushed/Crimped
- ☐ Cuffs
- ☐ Heat Treat
- ☐ Inspection Strip in Tube
- ☐ Ripples in Bend
- ☐ Torque Waves in Extrusion
- ☐ Turning Sequence
- ☐ Wave/Twist in Tube

General

- ☐ Bend
- ☐ BOM/Route
- ☐ Broken/Damaged
- ☐ Burrs
- ☐ Contamination
- ☐ Countersink
- ☐ Cut Too Short
- ☐ Drill Holes
- ☐ Drawing
- ☐ Finish
- ☐ Folio
- ☐ Grain
- ☐ Hardware
- ☐ Inspection Incomplete
- ☐ Instructions Incomplete/Unclear
- ☐ Maintenance
- ☐ Mislabeled
- ☐ Misread
- ☐ Offset
- ☐ Out of Calibration
- ☐ Out of Sequence
- ☐ Outside Dimensions
- ☐ Ovalized
- ☐ Over/Under tolerance
- ☐ Part Incorrect
- ☐ Part Lost/Missing
- ☐ Part Moved
- ☐ Positioned Wrong
- ☐ Power Loss/Surge
- ☐ Pressure/Forced
- ☐ Temperature/Cure
- ☐ Weld
- ☐ Wrong Stock Pulled
- ☐ Other _____

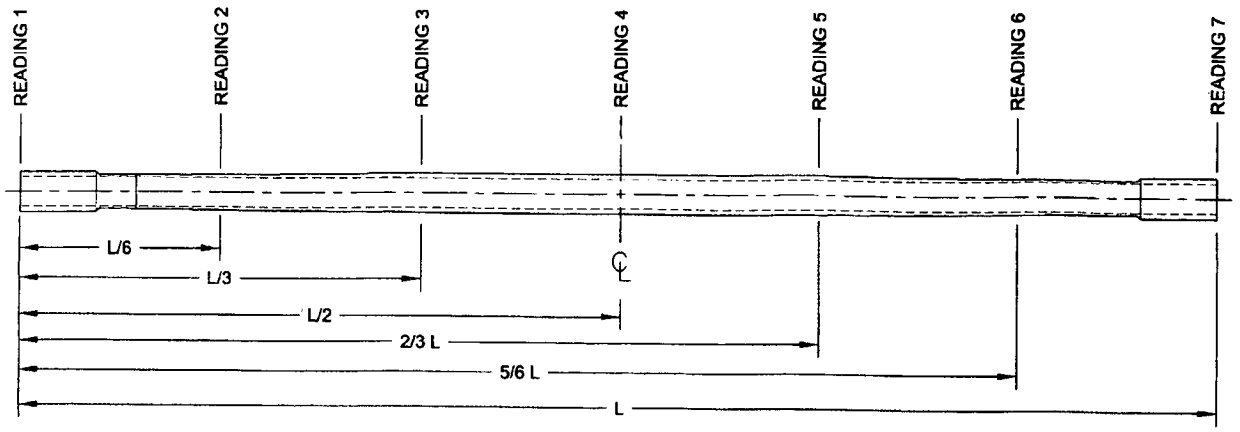
DART AEROSPACE LTD	Work Order:	88787
Description: Crosstube Assembly (412 High Aft)	Part Number:	D412-664-243
Inspection Dwg: D412-664-243 **Rev:** E		Page 1 of 2

FIRST ARTICLE INSPECTION CHECKLIST

	Inspection Sheet Drawing Dimension	Tolerance	Actual Dimension	Accept	Reject	Method of Inspection	Comments
SIDE A	2.684	+0.005/-0.000	2.689	✓		vern	CNC-06
	2.748	+0.005/-0.000	2.752	✓		↓	
	2.884	+0.005/-0.000	2.888	✓			
	3.019	+0.005/-0.000	3.024	✓			
	3.163	+0.005/-0.000	3.166	✓			
	3.308	+0.005/-0.000	3.313	✓			
	3.429	+0.005/-0.000	3.432	✓			
	2.990	+0.005/-0.000	2.991	✓			
	2.618	+0.005/-0.000	2.622	✓		↓	
	0.200	+/-0.010	.200	✓		vern	CNC-06
	R0.063	+/-0.010	.063	✓		RG	
	R0.500	+/-0.010	.500	✓		"	
	4.971	+/-0.030	4.971	✓		vern	CNC-06
SIDE B	2.684	+0.005/-0.000	2.689	✓		vern	CNC-06
	2.748	+0.005/-0.000	2.253	✓		↓	
	2.884	+0.005/-0.000	2.889	✓			
	3.019	+0.005/-0.000	3.024	✓			
	3.163	+0.005/-0.000	3.168	✓			
	3.308	+0.005/-0.000	3.313	✓			
	3.429	+0.005/-0.000	3.434	✓			
	2.990	+0.005/-0.000	2.991	✓			
	2.618	+0.005/-0.000	2.623	✓		↓	
	0.200	+/-0.010	.200	✓		vern	CNC-06
	R0.063	+/-0.010	.063	✓		RG	
	R0.500	+/-0.010	.500	✓		"	
	4.971	+/-0.030	4.971			vern	CNC-06
	124.100	+/-0.020	124.100			tape	LG-22

DART AEROSPACE LTD	Work Order:	88787
Description: Crosstube Assembly (412 High Aft)	Part Number:	D412-664-243
Inspection Dwg: D412-664-243 **Rev:** E		Page 2 of 2

WALL THICKNESS MEASUREMENT



Location	WALL THICKNESS MEASUREMENT (IN)				Deviation Δw (max-min)	TOLERANCE
	w1	w2	w3	w4		
READING 1 L= 0"	.372	.370	.365	.369	.007	0.073"
READING 2 L=	.320	.320	.304	.300	.020	
READING 3 L=	.496	.493	.466	.476	.030	
READING 4 L=	.638	.632	.620	.622	.018	
READING 5 L=	.486	.496	.474	.489	.022	
READING 6 L=	.311	.320	.304	.294	.016	
READING 7 L=	.387	.381	.364	.359	.028	

Calibration Result

Actual Block Thickness: 250 - 750

Sitescan 250 Measured Thickness: 250-750

Measured by:	KC
Date:	12-8-9

Audited by:	JW / DAS 16
Date:	12-8-16

Preliminary Approval:	
12/16/16 Date:	

Rev	Date	Change	Revised by	Approved
A	04.06.16	New Issue (P/O D412-664-203)	KJ/JLM	
B	06.03.09	Dwg Rev updated	KJ/JLM	
C	07.05.08	Tolerance updated for dimension 4.971	KJ/JLM	
D	10.02.02	Dimension 124.100 was 124.09	KJ	
E	12.06.04	Wall thickness form added	KJ	

Item	Qty -243	Part Number	Description
1	X	D412-664-243	CROSSTUBE ASSEMBLY (412 HIGH AFT)
2	1	D6009-129	CROSSTUBE
3	2	D3595-063-570	RUBBER CUSHION
4	1	D2896-1	SUPPORT
5	2	D3189-1	CHAFING SHIELD
6	2	D2856-600-1009	ABRASION STRIP
7	4	MS21920-28	CLAMP
8	2	MS21920-30	CLAMP (OR MS21920-32)
9	A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE)

SHOP COPY
RETURN TO
ENGINEERING
UNCONTROLLED COPY
SUBJECT TO AMENDMENT
WITHOUT NOTICE
WORK ORDER
NO. 88787 MLJ
12/08/03

② DEO ATTACHED

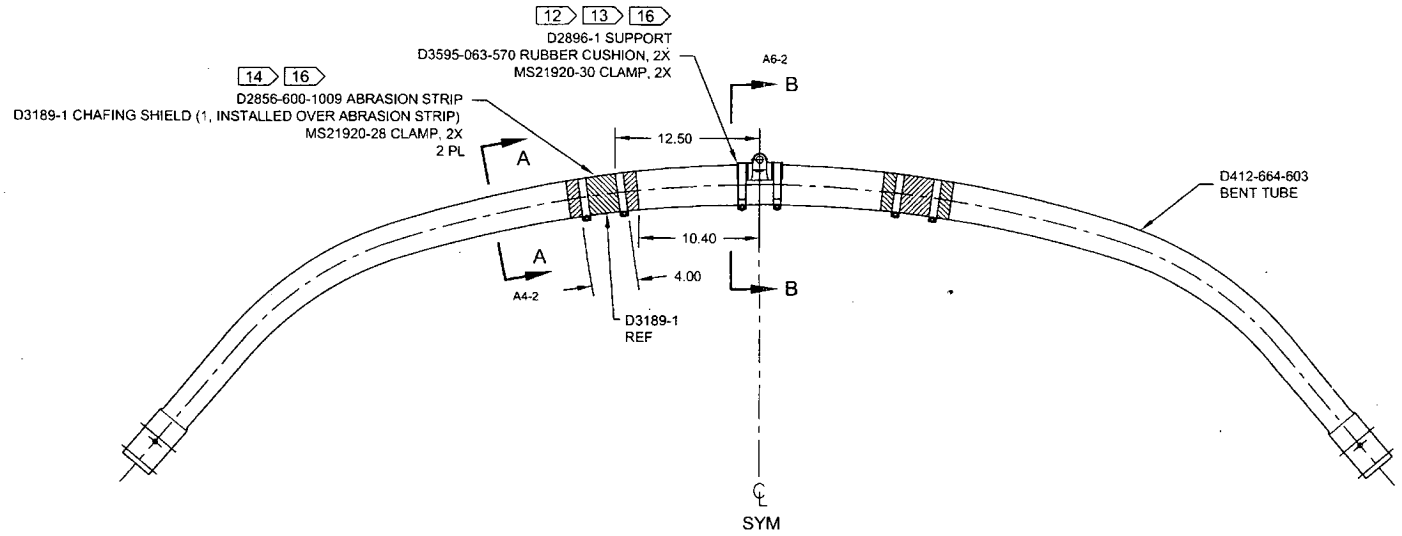
RELEASED
2009 -10- 29

GENERAL NOTES:

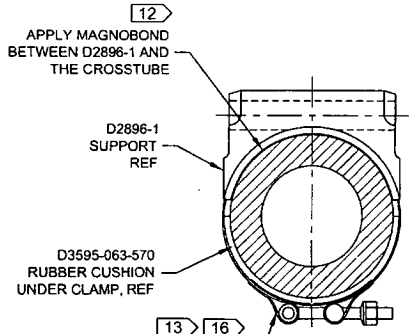
1) MATERIAL: MANUFACTURED FROM D6009-129
   FINISHED LENGTH = 124.100±0.020 (BEFORE BENDING/TRIMMING)
2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
   PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
   PAINT OUTSIDE PER DART QSI 005 4.2
3) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
4) UNITS: INCHES UNLESS OTHERWISE NOTED.
5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
6) IDENTIFICATION: SCRIBE DART PART NUMBER "D412-664-243" AND BATCH NUMBER ON INSIDE OF CUFF USING VIBRATING STYLUS.
7) WEIGHT: 47.0 lbs (PER IIN-D212-664)
8) PART IS SYMMETRIC ABOUT CENTERLINE.
9) RUN CUTTER OFF PART. BLEND OUT EDGE LONGITUDINALY, TRANSITION SHOULD BE SMOOTH.
10) BEND PROGRESSIVELY WITH A MINIMUM OF 8 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D.
11) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.
12) INSTALL D2896-1 SUPPORT USING 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 TO THE SURFACE OF D2896-1 THAT WILL BE IN CONTACT WITH THE CROSSTUBE PER QSI 015. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
13) INSTALL MS21920-30 CLAMPS (OR -32) WITH D3595-063-570 RUBBER CUSHIONS TO SECURE THE D2896-1 SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE OPPOSITE OF CROSSTUBE SUPPORT.
14) INSTALL D2856-600-1009 ABRASION STRIPS WITH A 0.13 REF GAP ON BOTTOM SIDE OF CROSSTUBE PER QSI 035.
15) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.
16) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

REV.	DESCRIPTION	BY	DATE
E	REFORMAT/REVISE GENERAL NOTES; REORGANIZED VIEWS AND REFORMATTED DRAWING TO CURRENT STANDARDS; RELOCATED FLAG #6 PER PAR 08-046 (ZN A6-3); ADD TOLERANCE (ZN B6-3, C4-3, C8-3 & C5-3); MOVED TURNING DETAIL & UPDATED TOLERANCE TO SHEET 4.	RF	09.09.30
D	REMOVE D2732-058, CHANGE TO D3595-063-570	PH	07.03.09
C	REMOVE D2856-600-1087, ADD D2732-058 & MAGNOBOND 6398, MS21920-32 WAS MS21920-30	MB	06.10.27
B	ADD HOLES FOR COMPATABILITY WITH BHT/AA SKIDTUBES	PH	05.02.04
A	NEW ISSUE	PH	01.10.17

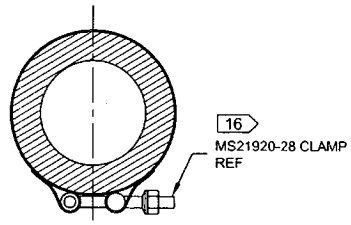
DESIGN	PH	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
DRAWN	RF		
CHECKED		DRAWING NO.	REV. E
MFG. APPR.		D412-664-243	SHEET 1 OF 4
APPROVED		TITLE	SCALE
DE APPR.		CROSSTUBE ASSEMBLY (412 HI AFT)	NTS
DATE	09.09.30		



D212-664-243
ASSEMBLY DETAIL E



SECTION B-B D4-2
SCALE 4X



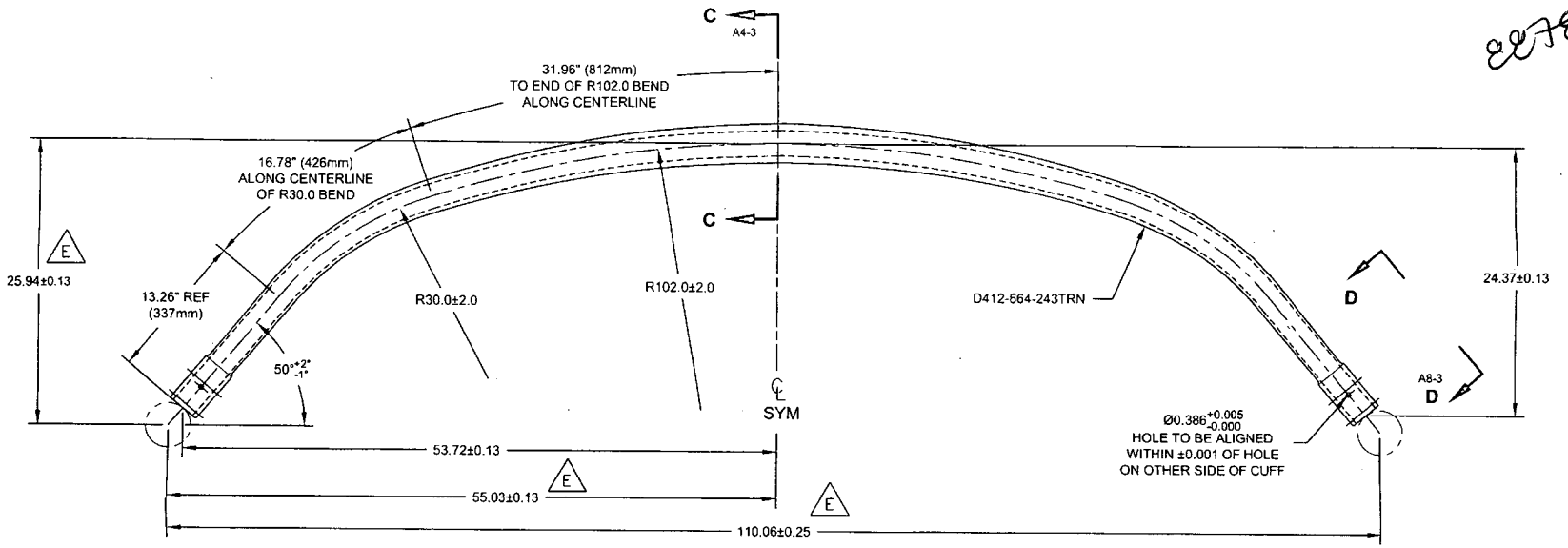
SECTION A-A C6-2
SCALE 4X

88705

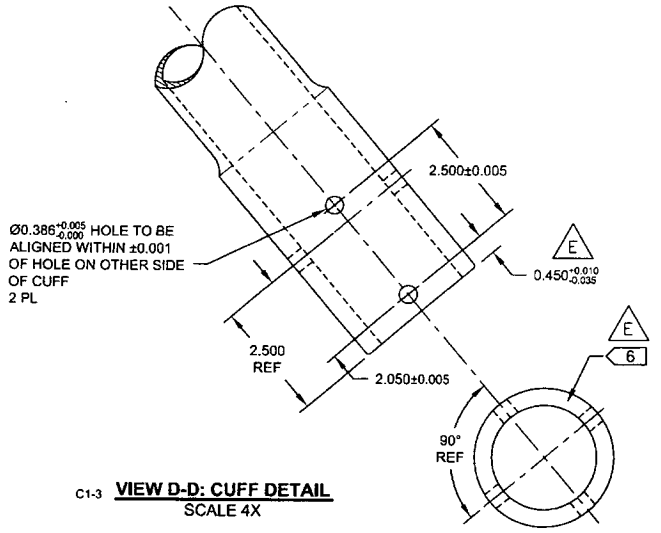
② DEO 13 ATTACHED

RELEASED
2009 -10- 29

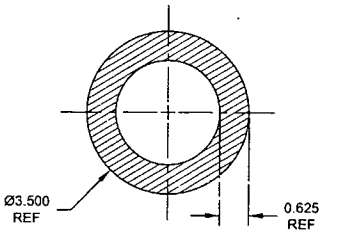
DESIGN	PH	**DART AEROSPACE LTD**	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED		DRAWING NO.	REV. E
MFG. APPR.		D412-664-243	SHEET 2 OF 4
APPROVED		TITLE	SCALE
DE APPR.		CROSSTUBE ASSEMBLY (412 HI AFT)	NTS
DATE	09.09.30		



D412-664-603 10
BENDING AND DRILLING DETAIL E



C1-3 **VIEW D-D: CUFF DETAIL**
SCALE 4X

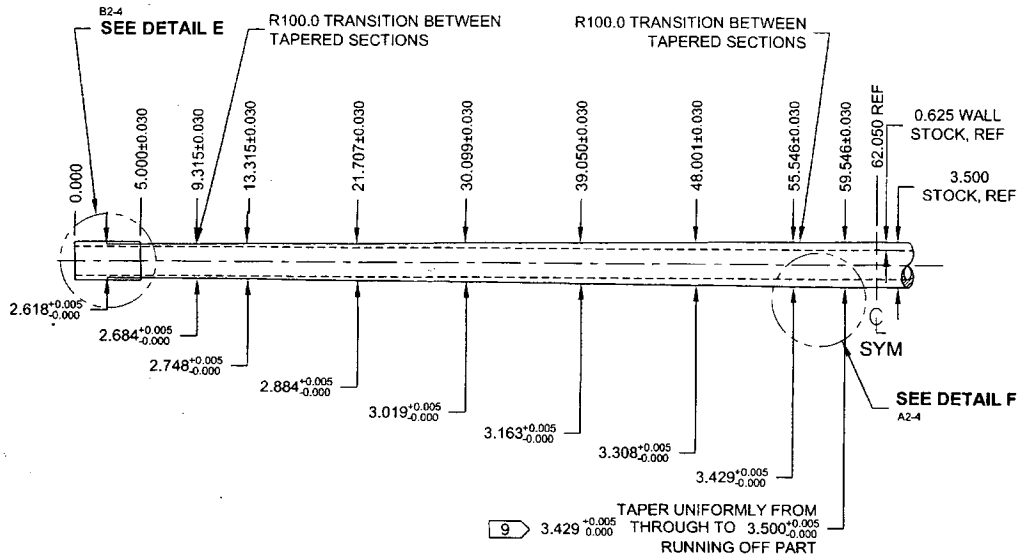


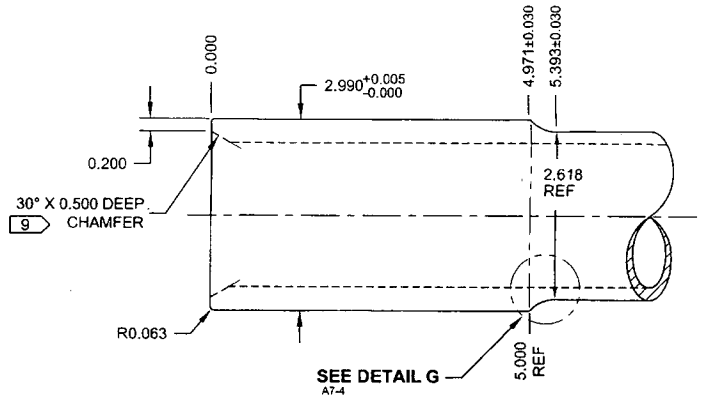
SECTION C-C D5-3
SCALE 4X

② DEO 25 ATTACHED

RELEASED
2009 -10- 29

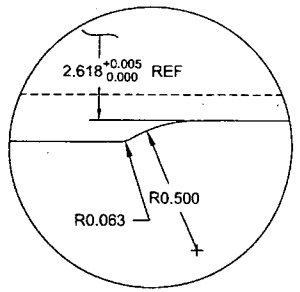
DESIGN	AH	**DART AEROSPACE LTD**	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED		DRAWING NO.	REV. E
MFG. APPR.		D412-664-243	SHEET 3 OF 4
APPROVED		TITLE	SCALE
DE APPR.		CROSSTUBE ASSEMBLY (412 HI AFT)	NTS
DATE	09.09.30		



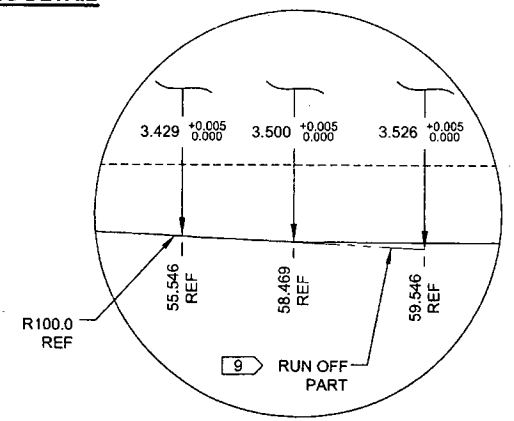


DETAIL E:
CROSSTUBE CUFF D8-4
SCALE 5X

D412-664-243TRN TURNING DETAIL E



DETAIL G:
CUFF TRANSITION C2-4
SCALE 10X



DETAIL F:
TAPER RUN-OFF C4-4
NOT TO SCALE

2 DEO'S ATTACHED

RELEASED
2009 -10- 29

DESIGN	PH	**DART AEROSPACE LTD** HAWKESBURY, ONTARIO, CANADA
DRAWN	RF	
CHECKED		DRAWING NO. D412-664-243 REV. E SHEET 4 OF 4
MFG. APPR.		
APPROVED		TITLE CROSSTUBE ASSEMBLY (412 HI AFT) SCALE NTS
DE APPR.		
DATE 09.09.30		

DRAWING NO.	TITLE	REV. E	DART AEROSPACE LTD	D.E.O. NO.	SHEET NO.	SCALE
D412-664-243	CROSSTUBE ASSEMBLY (412 HI AFT)		ENGINEERING ORDER	D412-664-243-E-1	SHEET 1 OF 2	NTS

DRAWN	CHECKED	MFG. APPR.	APPROVED	DE APPR.
DATE 11.03.31	DATE 11/03.31	DATE 11.03.31	DATE 11/03.31	DATE 11.03.31

PURPOSE:
REMOVED ABRASION STRIP IN FAVOR OF A THIN LAYER OF PROSEAL 890.

E0787

CHANGE:

PARTS LIST IS AMENDED AS FOLLOWS:

IS:

Item	Qty -243	Part Number	Description
6	0	D2856-600-1009	ABRASION STRIP

WAS:

6	2	D2856-600-1009	ABRASION STRIP

NOTES 2 AND 14, SHEET 1 ARE AMENDED AS FOLLOWS:

IS:

2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
MASK UNDERSIDE OF CROSSTUBE AS SHOWN (HATCHED AREA)
PAINT OUTSIDE PER DART QSI 005 4.2
AFTER PAINTING, APPLY CLEAR COAT ON HATCHED AREA

14) APPLY A THIN COAT OF PROSEAL 890 ON INSIDE CONCAVE SURFACE OF D3189-1 CHAFING SHIELD AND LET CURE PER MANUFACTURER'S INSTRUCTIONS. INSTALL PROSEALED D3189-1 CHAFING SHIELD ONTO CROSSTUBE BY APPLYING A THIN COAT OF PROSEAL 890 ONTO CROSSTUBE. BE SURE TO ELIMINATE ANY AIR GAPS.

RELEASED 2011-04-07

WAS:

2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART QSI 005 4.2

14) INSTALL D2856-600-1009 ABRASION STRIPS WITH A 0.13 REF GAP ON BOTTOM SIDE OF CROSSTUBE PER QSI 035.

DRAWING NO.	TITLE	REV. E	DART AEROSPACE LTD ENGINEERING ORDER	D.E.O. NO.	SHEET NO.	SCALE
D412-664-243	CROSSTUBE ASSEMBLY (412 HI AFT)			D412-664-243-E-1	SHEET 2 OF 2	NTS

DRAWN	CHECKED	MFG. APPR.	APPROVED	DE APPR.
DATE 11.03.31	DATE 11.03.31	DATE 11-03-31	DATE 11.03.31	DATE 11.03.31

2007-07

IS:

16 14

D3189-1 CHAFING SHIELD (1, INSTALLED OVER PROSEAL 890)
MS21920-28 CLAMP, 2X
2 PL

D412-664-603
BENT TUBE

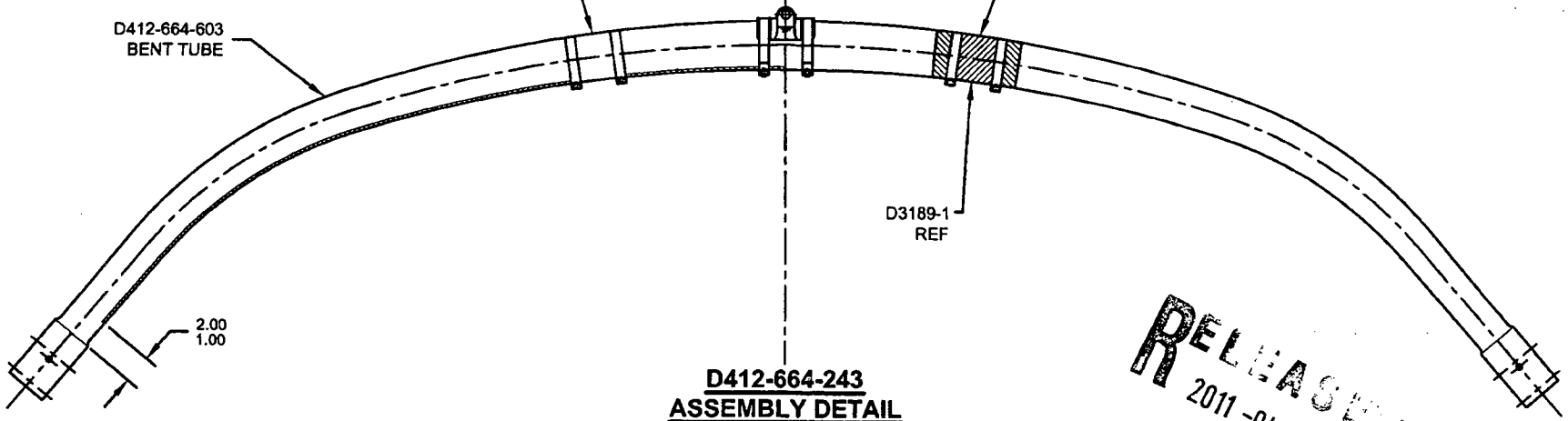
2.00
1.00

WAS:

14 16

D2856-600-1009 ABRASION STRIP
D3189-1 CHAFING SHIELD (1, INSTALLED OVER ABRASION STRIP)
MS21920-28 CLAMP, 2X
2 PL

D3189-1
REF

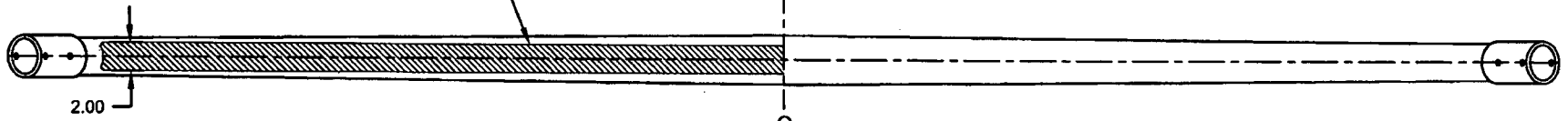


RELEASED
2011-04-07

D412-664-243
ASSEMBLY DETAIL

2

MASK AREA PRIOR TO PAINTING AND
APPLY CLEAR COAT AFTER PAINTING



2.00

℄
SYM

DRAWING NO.	TITLE	REV. E	DART AEROSPACE LTD	D.E.O. NO.	SHEET NO.	SCALE
D412-664-243	CROSSTUBE ASS'Y (412 HI AFT)		ENGINEERING ORDER	D412-664-243-E-2	SHEET 1 OF 1	NTS

DRAWN	CHECKED	MFG. APPR.	APPROVED	DE APPR.
DATE 11.09.07	DATE 11.09.19	DATE 11.09.19	DATE 11.09.19	DATE 11.09.19

E0783

PURPOSE:
REPLACE MAGNOBOND WITH 3M DP460 SCOTCH-WELD EPOXY ADHESIVE

CHANGE:

IS:

Item	Qty -243	Part Number	Description
9	A/R	SCOTCH-WELD DP460	EPOXY ADHESIVE, 3M SCOTCH-WELD

WAS:

9	A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE)

NOTE 12 & 16, SHEET 1 IS AMENDED AS FOLLOWS:

IS:

12) INSTALL D2896-1 CENTER SUPPORT USING A 0.04" TO 0.07" THICK LAYER OF SCOTCH-WELD DP460 PER QSI 015. LET CURE FOR 24 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.

16) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING. **PRIOR TO PACKAGING, RE-CHECK TORQUE ON CLAMPS AFTER ADHESIVE HAS CURED FOR 24 HOURS.**

RELEASED 2011-09-29

WAS:

12) INSTALL D2896-1 SUPPORT USING 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 TO THE SURFACE OF D2896-1 THAT WILL BE IN CONTACT WITH THE CROSSTUBE PER QSI 015. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.

16) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.